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AUTHOR Sulzer-Azaroff, Beth
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ABSTRACT

Behavior analysis has contributed dramatically toward educational improvement. It has helped to produce impressive increases in rates and durability of simple and complex learning among students with widely disparate capabilities and levels of preparation. Behavior analysis has demonstrated that: (1) everyone can learn; (2) complex skills can be taught; (3) precise, general, and durable performance can be taught; (4) behavioral instruction can be cost effective; and (5) barriers to learning can be overcome. It has discovered ways to remove barriers to learning, such as inadequate student preparation or interfering behaviors. Its methodological rigor and the generality of its findings lend further support to the value of behavioral analysis for education. Nevertheless, many areas of concern remain to be addressed. Among others, these include the need for increased emphasis on both basic and applied research on learning and retention, and methods for promoting dissemination and utilization of effective behavioral instructional strategies. There may be several factors currently preventing the wide acceptance of behavioral methods. Many educators are unaware of or misinformed about the advantages of behavioral strategies. Even those who are aware of the benefits of behavioral strategies may lack the skill to implement them successfully. In addition, current contingencies impede or fail to support implementation of behavioral methods. Procedures are needed to inform educators about behavioral strategies, to shape behavioral skills, and to identify and manage various impediments and supports. An 11-page reference list is appended. (Author/NB)

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Behavior Analysis and Education:
Crowning Achievements and Crying Needs

Beth Sulzer-Azaroff

University of Massachusetts at Amherst

CG 019008

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Abstract

Behavior analysis has contributed dramatically toward educational improvement. It has helped to produce impressive increases in rates and durability of simple and complex learning among students with widely disparate capabilities and levels of preparation. It has discovered ways to remove barriers to learning, such as inadequate student preparation or interfering behaviors. Its methodological rigor and the generality of its findings lend further support to the value of behavioral analysis for education. Nevertheless, many areas of concern remain to be addressed. Among others, these include the need for increased emphasis on both basic and applied research on learning and retention, and methods for promoting dissemination and utilization of effective behavioral instructional strategies.

Behavior Analysis and Education:
Crowning Achievements and Crying Needs

Since the late fifties, when behavioral principles began to be applied toward the solution of educational problems (e.g. Skinner, 1958), progress has continued to accelerate. By the mid eighties, behavioral studies have demonstrated that essentially all students, regardless of preparedness, deprivation or disability, are capable of simple and complex learning. Principles of behavior have been applied effectively to remove barriers to student learning; to help students to learn rapidly, precisely, durably and cost effectively; and to express what they have learned in new situations.

Because behavior analysis is methodologically rigorous, and its procedures broadly disseminable and effectively applicable among various populations, one might assume its ready acceptance among educators and the general public. Yet, while such acceptance may be growing, evidence of widespread application is lacking; and other issues also remain to be addressed. The aim of this paper is to review some of behavior analysis' major contributions to education and then to discuss a number of critical areas that continue to pose a challenge.

Everyone Can Learn

In the not too distant past, certain populations generally were considered incapable of learning. Rejecting that notion, behavior analysts met the challenge with impressive success. Strategies were fashioned to instruct developmentally disabled children to walk (O'Brien, Azrin, & Bugle, 1972), to communicate

(Barrera & Sulzer-Azaroff, 1983; Carr & Durand, 1985), to care for themselves personally i.e., to comb their hair, brush their teeth, bathe (Horner & Keilitz, 1975; Sowers, Rusch, Connis, & Conningham, 1980); to enjoy recreational activities (Haring, 1985); to learn academic and pre-academic skills, such as reading, writing, spelling (Miller, Cuvo, & Borokove, 1977). More mature developmentally disabled people have been helped to acquire such skills as are involved in performing a job (Sowers, Verdi, Bourbeau, & Sheehan, 1985), keeping house (Thomas, Sulzer-Azaroff, Lukeris, & Palmer, 1977), and engaging in recreation (Johnson & Bailey, 1977) and social interactions (Odom, Hoyson, Jamieson, & Strain, 1985). The list continues on and on.

Behavioral procedures have not been restricted to dealing with deficiencies or disabilities. In 1968, Keller showed how students could effectively master text material at advanced levels using the Personalized System of Instruction (PSI). The elements of PSI (mastery requirement, regular quizzing, immediate proctoring by peers, precisely specified objectives etc.) have been used to promote high quality academic performance among not only undergraduate but also post-graduate students (e.g., Chase, Johnson & Sulzer-Azaroff, 1985; Johnson & Sulzer-Azaroff, 1978; Johnson, Sulzer-Azaroff, & Maass, 1976; Sulzer-Azaroff, Johnson, Dean, & Freyman, 1977).

Professionals, paraprofessionals, managers and parents are among the many other student populations who have profited from behavioral instruction. For example, applied behavioral procedures have been used to help workers improve their performance on the job (Maher, 1981) and mothers and fathers to

increase their parenting skills (e.g., Flanagan, Adams, & Forehand, 1979).

Students can also learn to teach their peers (e.g., Greer & Polirstok, 1982) and themselves and to manage their own behavior. Behavioral procedures have enabled people successfully to teach themselves to exercise (Wysocki, Hall, Iwata, & Riordan, 1978), modify their habits (Van Houten & Rolider, 1984), to stop abusing substances (McCaul, Stitzer, Bigelow, & Liebson, 1984) or people (Dachman, Halasz, Bickett, & Lutzker, 1984), manage their time efficiently (Hall, 1985) and so much more. Given the proper support, we <u>are</u> capable of carrying out our own good intentions (Mahoney & Thoresen, 1974; Sulzer-Azaroff & Reese, 1982)[2]

Behavioral procedures are not a panacea, nor is it reasonable to apply them to teach instructional objectives way beyond the individual student's current repertoire of behaviors. Rather, current individual repertoires can be modified and amplified, provided necessary resources are available and procedures applied effectively. In one case the objective may be to write a theme; in another to master an examination on matrix algebra; while for a third, it could be to chew and swallow solid foods.

<u>Complex Skills Can be Taught</u>

Less complicated performances have often been the subject of behavior change programs, for example remaining in-seat (Thomas, Becker, & Armstrong, 1968), completing assignments (Hopkins, Shutte, & Garton, 1971), reducing talking out (Schmidt & Ulrich, 1969), engaging in studying or on-task behavior (Hall, Lund, &

Jackson, 1968) and increasing teacher praise (Cossairt, Hall, & Hopkins, 1973). Yet considerable evidence has shown that complex behavioral targets are as teachable as simple ones: creating in writing (Maloney & Hopkins, 1973), art (Goetz & Salmonson, 1972), block design (Goetz & Baer, 1973); using general strategies to solve problems (Bryant & Budd, 1982); acquiring social skills (Rhode, Morgan, & Young, 1983); being able to define, discriminate, or illustrate particular concepts (Chase et al., 1985) or to apply complicated rules (Whitman & Johnson, 1983) and many other advanced skills. Behavioral educators have taught instructors how to write educational plans capable of evaluation (Maher, 1981), to apply complex procedures such as shaping, differential reinforcement and fading (Cossairt et al., 1973) and to manage their own behavior or that of their peers (Jones, Fremouw, & Carples, 1977).

Precise, General, and Durable Performance Can be Taught

Behavioral educators have learned that the key to teaching complex skills is to identify precisely the critical features of those skills (Mager, 1962, 1972). They have found how important it is to be very clear about what behavior is to change under what set of conditions--to say exactly what is to be done, how soon following the response, how often, and to add other necessary qualifiers. They also recognize that teaching only the general case is no guarantee that it will be applied to any specific one, nor that mastery of the specific case will guarantee transfer to the general. The field has begun to apply a technology of generalization (Drabman, Hammer & Rosenbaum, 1979; Stevenson & Fantuzzo, 1984; Stokes & Baer, 1977) and is learning how to

promote transfer without needing to teach completely each and every behavior under each and every selected circumstance (Odom et al., 1985). For example, by being asked to identify and generate sufficient exemplars, students can acquire general concepts more effectively (Chase et al., 1985).

Through laboratory investigation and field application, behavioral researchers continue, as their progenitors have (e.g., Ferster & Skinner, 1957), to isolate variables that may be applied to increase the precision, durability or pace of performance. One example, among many, is the work on "errorless learning" (Etzel, LeBlanc, Schilmoeller, & Stella, 1981; Reese, 1971; Sidman & Stoddard, 1967; Touchette & Howard, 1984) in which antecedent stimuli are carefully faded along some critical dimension so that in the presence of multiple stimuli, the subject makes almost no incorrect choices. Demonstrations of errorless procedures to teach the developmentally disabled to read or learn number concepts, as in Reese's 1971 film Born to Succeed, are both exciting and touching.

Recently, much has been learned about selecting effective but non-intrusive low cost reinforing consequences. One way, for instance, is by identifying the contingencies that operate naturally within a particular system. Previously, artificial objects or events such as treats, trinkets or other costly items might have been an arbitrary first choice; now they are apt to be used only when natural reinforcers fail to produce the necessary effect. Often activities inherent in the school environment have been found to serve just as well: opportunities to select a seat

or gain access to materials, to engage in preferred instructional or service (Campbell & Sulzer, 1971) or recreational activities (Hopkins, Schutte, & Garton, 1971), and so on.

Coveted activities or objects are being utilized in "incidental teaching", helping many students to increase their language (McGee, Krantz, & McClannahan, 1985), reading (McGee, Krantz, & McClannahan, 1984), and other academic skills. (A child whines and gestures toward a toy car on a shelf. "What do you want?" inquires the teacher. "Do you want the car?" "Car," answers the child, and the teacher gives it to him. Later on the child may be cued and required to elaborate the response, with adjectives such as color, size, ordinal position or so on.)

It has been found that the timing with which instructions, cues or prompts are presented makes a difference; in general, more rapidly is better (Carnine, 1976). In addition, by hooking into the natural contingencies, as just described, teachers can help students to sustain their newly developed performances. The futility of teaching a child to use a social or language skill that will be ignored or punished socially has become recognized. (Saying "To whom am I speaking" rather than "Who's calling?" would rapidly deteriorate in most segments of American adolescent culture.) Instead, skills are selected that the environment is likely to support and thereby cause to endure (e.g., Polirstock & Greer, 1977). Behavioral Instruction Can be Cost Efficient

Capitalizing on the natural environment and teaching more rapidly and precisely is cost efficient. So is exploiting freely available resources to apply as reinforcing contingencies (Campbell & Sulzer, 1971) and for related purposes. Peer

tutoring or proctoring is a case in point (Greenwood et al., 1984). Both tutors and tutees can profit from peer tutoring, especially when their repertoires are closely matched and the tutor is trained and supervised. Tutors gain additional practice and tutees more individualized attention and immediate reinforcing and corrective feedback. This is also the case when instructional staff are involved in teaching their peers (Jones et al., 1977; Mayer, Butterworth, Nafpaktitis, & Sulzer-Azaroff, 1983). Another obvious example is self-instruction (Burgio, Whitman & Johnson, 1980). Involving students or teachers as their own instructors avoids considerable training costs while increasing the student's opportunity to respond--a key element for enhancing academic progress (Hall, 1985).

Barriers to Learning Can be Overcome

Behavioral educators recognize that disparities exist in how well prepared different students may be for undertaking new challenges. When students fail to achieve an objective, it may be a result of their lacking necessary prerequisite skills. When this is suspected, the learning task is broken down into its component parts, including identifying each of the sub-skills that enable the more complex to be achieved. This task analysis continues until the point is reached where it becomes clearly evident that the student can perform that skill. An example is trying to instruct someone unfamiliar with the meaning of "subject" and "predicate" to "construct sentences in which the subject and predicate verb agree in number." First those terms would have to be taught.

Similarly, task analyses have been used in teaching many kinds of complex tasks to all categories of students: bed making (Thomas et al., 1977) or product assembly (Walls, Zane, & Ellis, 1981) and other job skills (Ackerman & Shapiro, 1984) to the developmentally disabled; problem solving skills in arithmetic (Bryant & Budd, 1982) to special needs or typical school children, and many others.

One of the early breakthroughs of behavior analysis in education was the discovery of a set of benign methods for managing deportment, especially when unruly conduct interfered with students' learning. Differential attention from the teacher (Thomas et al., 1968), modeling (Kazdin, 1973), approval from instructors (Cossairt et al., 1973), peers (Dougherty, Fowler, & Paine, 1985), and the students themselves (Seymour & Stokes, 1976), contingent access to preferred activities (Hopkins et al., 1971), token systems (Sulzer-Azaroff & Mayer, 1977) and many other methods have successfully diminished misconduct. Similar results have been found when assignments are made interesting and challenging and are matched to the students' repertoires. Seeking attention through misbehavior is less likely when the assignment contains its own rewards (e.g., Aaron & Bostow, 1978).

Behavioral Analyses are Methodologically Rigorous

Behavior analysis uses precise assessment strategies (Michelson, Mannarino, Marchione, Kazdin & Costello, 1985) and functionally analyzes the effects of interventions (Baer, et al., 1968; Sulzer-Azaroff & Mayer, 1977). Directly observing behavior as it is expressed, or measuring its immediate products, lessens

distortion. Intensive designs permit such potentially confounding variables as subject differences, reactivity to observers, seasonal variations, passage of time, and others, to be controlled. Such rigour should lend credibility to findings by behavior analysts in education and elsewhere.

Behavioral Outcomes Can be Reproduced Broadly

That these major achievements of behavior analysis are not just limited to one particular student population or locale has been dramatically demonstrated in a number of cases. Keller's PSI has been used effectively in hundreds of colleges and universities (Johnson & Ruskin, 1977) and behaviorally based Follow-Through programs have been applied successfully in many geographical regions (Abt Associates, 1976). Apparently even students and teachers whom behavior analysts have not encountered directly, have benefited from the discoveries of this field.

Evidence increasingly mounts to show how teaching and learning can be promoted through the application of behavior analysis. Yet, despite such achievements, shortcomings do exist. Several of these will be discussed next.

Crying Needs

The challenge for the field of behavior analysis in education is no different from that for the entire educational establishment: to progress toward excellence. A recent paper (Sulzer-Azaroff, 1985) reacted to the report by the National Commission on Excellence in Education (1983). The Commission's report contained a number of facts indicating how our nation was in jeopardy educationally plus a set of recommendations for

overcoming the deficiencies. The "Behaviorist's response..." commented on what behavior analysis has to offer now and in the future, and suggested that behavioral educators assist by identifying and using natural and human resources, developing curriculum materials, continuing to discover variables that influence learning, addressing the needs of "thin market areas," modeling evaluation models, communicating behavioral strategies and findings, continuing to search for ways to promote more efficient and effective use of instructional and learning time, and functionally analyzing the strategies that the the Commission recommended, (e.g., merit pay for teachers).

In addition to those suggestions, several other concerns are worthy of discussion. One relates to an apparently diminishing emphasis upon basic laboratory research; another to the limited applications of effective behavioral practices in the schools.

Diminishing Emphasis on Experimental Psychology

The percentage of new doctorates in experimental/comparative/physiological psychology, presumably including experimental analysts, has declined extensively--showing a 53% loss since peaking in 1971 (Bramblett & Pion, 1985; Committee on Employment and Human Resources, 1985). What factors might be responsible? Perhaps funding agencies are treating research of immediate social relevance preferentially, thereby diminishing training and employment opportunities. Maybe promising candidates avoid the laboratory because they assume it would require them to work with non-human subjects. If so, the field's recently increased emphasis on human research may help. (Note recent trends in the Journal of the Experimental Analysis of Behavior.)

The outcry of animal rights activists and other forms of political pressure probably are taking their toll too. Insofar as animal research is concerned, perhaps the new ethical guidelines (American Psychological Association, 1985) will help dispell the concerns of some former critics. Yet political factors can and have produced damage, by interfering with research on topics of critical relevance to education and other applied areas. For instance, studies of aggression and of illicit drugs were both targeted several years ago for political attack by a U.S. Senator. As a result, important questions that are difficult to study ethically or practically with humans in natural settings may be forced to remain unanswered.

Do behavior analysts themselves need to be reminded periodically of the importance of laboratory as well as field based experimentation? Practitioners involved with applied problems sometimes forget that basic experimental discoveries have been the lifeblood of their discipline. Those of us emphasizing field applications need to remember not only that the fundamental principles of behavior upon which procedural applications have been based were discovered in the laboratory, but also that certain questions cannot be functionally analyzed easily in the field. For example, methodologically precise, complex parametric research can be difficult, if not impossible in natural settings. Just as basic researchers need to remind themselves of the value of applied demonstrations of the generality and social validity of their findings, applied analysts need to recognize the necessity for and their dependence

upon laboratory experimentation. We also need to remember to communicate our respect to behavior analysts working in either setting.

Barriers to Wide Scale Adoption of Behavioral Procedures

In 1970, Sidney Bijou argued that the ultimate result of applying behavioral principles in schools would be a better educated community. Similar arguments have been propounded by Skinner (1968), by Mayer and this author (Sulzer & Mayer, 1972, Sulzer-Azaroff & Mayer, 1986) and many other behavioral educators. Yet wide-scale adoption of behavioral principles and practices remains an unfulfilled promise. Why don't all educational establishments use the behavioral strategies that have been demonstrated to solve so many of their most pressing issues? Just implementing a modest number of techniques, such as benign and productive methods for managing deportment and promoting learning, could revolutionize education. Yet even when extensive, carefully designed comparisons, such as those done with Follow Through and PSI, have demonstrated their superiority, the methods fail to be adopted universally.

Perhaps those who share this concern need to remind themselves that the "subject is always right." If behavioral strategies are not being applied wholesale, the appropriate conditions are not in place. To have an impact, the barriers to change need to be discovered and those capable of modification functionally analyzed. Here are three among a number of factors, that may be preventing wide acceptance of behavioral methods:

1. Many educators are unaware of or misinformed about the advantages of behavioral strategies.

2. Even when they are aware of the benefits of those strategies, they may lack sufficient skill to implement them successfully.

3. Current contingencies impede or fail to support implementation of the methods.

If any of these hypotheses are correct, controlling variables should be pinpointed and well developed strategies used to analyze them.

Informing Educators about Behavioral Strategies

Much misinformation prevails about behavioral procedures: They don't work; they are manipulative and exploitative; behavior analysis deals only with the simplistic and different models are needed to handle more complex performance, such as cognition and emotional expression. All of these perspectives are clearly erroneous, as considerable research has demonstrated.

Yet such misconceptions are expressed so frequently as to suggest that the general public and educators need to be better informed. Definitions of terms should be corrected and concepts clarified. Potential consumers need to be told why it is unlikely that behavior analysis would be used exploitatively and more probably will but used humanely and beneficially: Its reliance on objectively derived information; the public nature of the objectives, procedures, data and so on; the fact that the effectiveness of its methods has been subjected to experimental verification; that behavior analysis has the tools for analyzing complex behavior and is doing so increasingly; and others.

But how is such information to be communicated? Besides the

obvious methods, like presenting lectures and writing books, educators (as well as parents and other community members) can be informed through the media: television, radio, newspapers, films, magazines, trade books and so on. (Ed Morris, 1985, has prepared an excellent document outlining how this may be accomplished.) Courses and in-service training on the topic are other means[3]. Live or filmed demonstrations of effective use of the strategies for teaching or otherwise modifying behaviors of interest to wide audiences can be especially compelling. Observing handicapped children say their first words, take their first steps or stop abusing themselves, or high school students showing and explaining their discoveries at a science fair can go much farther with some audiences than giving a lengthy recitation of quantitative findings.

Caution is necessary, however, when it comes to input of this sort. First, presenting public information involves managing antecedent events, and how those particular antecedents influence the behavior of individuals is not known. Without a familiarity with the consequences for applying behavioral procedures, critical information is missing. Perhaps, for example, some have experienced punishment or extinction when they tried methods (behavioral or other) advocated by outsiders.

Second, it is important to exercise caution so as not to mislead potential consumers. Perhaps the wonders of behavior analysis in education can be concisely distilled into a single in-service session or paper. Yet no brief verbal exchange can take the place of guided and reinforced practice. Audiences must be carefully informed that, while seemingly direct and

straightforward, there is nothing simple about applying behavioral strategies. Otherwise, they might be fooled into making cursory attempts, fail, and conclude that the approach is valueless. In certain circumstances, a little information can be more deceptive than no information at all.

Third, honesty and forthrightness about the limitations of behavioral discoveries are essential, as is the importance of crediting other disciplines with their own valuable accomplishments. No, behavior analysis has not discovered all, or even most of the answers; only some that can prove valuable, along with tools for discovering much, much more. Behavior analysis could increase its efforts in a number of crucial facets of education. Advanced curriculum development is one, particularly in the more complex cognitive or verbal areas. Reading comprehension, the higher order reasoning that characterizes problem solving in physics, chemistry, economics, psychology, political science and other secondary school and college subjects are others. The field has yet to devise methods for producing brilliant creations in the arts or appreciation of such products. While a few behavioral techniques for teaching altruism, and control of impulsivity do exist (Bryant & Budd, 1984; Kendall & Finch, 1976), much more needs to be done there, along with strategies for teaching responsible citizenship, love of learning, awareness of the lessons history has to teach us and so much more.

While behavior analysts have begun to address a few of these issues, they need to recognize that while using different

paradigms, others have progressed further in many areas of educational importance (e.g., moral development, Staub, Bar-Tal, Karylowski & Reykowski, 1984). By becoming familiar with correlational and inferential findings detected by investigators operating from perspectives outside of their own field, behavior analysts also can locate promising variables to functionally analyze.

When it comes to dissemination and persuasion, there is much to learn: How much information to deliver? Of what type? In what manner? To what audiences? Under what circumstances?--These are questions pleading to be analyzed experimentally. The answers may help convince educators of the attractiveness of behavioral methods.

Shaping Behavioral Skills

Because just supplying information often is insufficient to produce skillful behavioral educators, it is fortunate that much has been learned about how to train skilled performance. One model has been especially effective: Instruct, show, guide, and reinforce; reinforce successive approximations or responses of increasing complexity, or those expressed either more rapidly or with more ease or greater stability. A set of applications of those procedures contained in a manual including workshops and field experiences for student and in-service personnel trainees (Sulzer-Azaroff & Reese, 1983) is one example. While that particular training curriculum may not be universally suitable, the general tactic should be.

Identifying and Managing Impediments and Supports

Although much remains to be learned about effective

training, the main question in not how to conduct skill training effectively but how to encourage oneself and others to use it. For instance, while many trainers of behavioral practitioners should know better, how many regularly involve students or trainees in the guided practice of behavioral skills, and provide differential reinforcement along the way? If training is to be effective and others encouraged to adopt these methods, it is important to be exemplary trainers and to serve as models. Yet things get in the way: learning histories, for one. Where did trainers learn most of what they know about teaching? Not from books, journals or lectures, but from their own teachers. Similarly, colleagues who cling to traditional ways are unlikely to reinforce peer experimentation with behavioral methods. All are discouraged from trying to do things differently.

Yet some educators do succeed in applying behavioral strategies. It is important to identify the circumstances that have supported those efforts. Perhaps one or more of a number of variables may be responsible: positive feedback from supervisors, behavioral colleagues, or students; evidence of improved student performance; fortuitous early experiences; self management strategies; and others. Assuming they are capable of being managed, possible factors like those need to be functionally analyzed.

One more possibly disquieting fact needs to be faced: Maybe we are erring by failing to offer educators what they want most (a point made by Wyatt, Hawkins and McCoy, 1984). School personnel may begin to employ behavioral practices increasingly

as those practices begin to solve their most pressing problems. The reinforcers then will be intrinsic to the methods.

In addition to supplying teachers with benign but effective management strategies, other issues could be tackled. Here are some: Producing financial savings by reducing acts of vandalism (e.g., Mayer, Butterworth, Nafpaktitis, & Sulzer-Azaroff, 1983) staff and student absenteeism (Sulzer-Azaroff & Mayer, 1986), material waste and other problems; protecting students and/or their teachers from bodily harm by preventing accidents (Page, Iwata, & Neef, 1976; Peterson, 1984; Yeaton & Bailey, 1978), student violence (Sulzer-Azaroff & Mayer, 1986), early pregnancy, substance abuse; increasing staff's satisfaction with their jobs by providing uncomplicated methods for improving student conduct and promoting the kinds of learning they consider significant and important and by arranging for regular reinforcement for such accomplishments; improving the public image of the school by promoting notable student accomplishments, such as outstanding performance on standardized tests, prizes and awards; and engineering behavioral methods so that they become easier to apply. Surely there are others.

These are a few of the challenges facing behavior analysts and other psychologists who hope to promote educational improvement. Enormous progress has taken place over the past 25 years, yet much more remains to be accomplished. The momentum is in place. Joining in the continuing development and expansion should prove to be just as reinforcing.

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Footnotes

1. This paper is based on the Presidential Address to Division 25, the Division of the Experimental Analysis of Behavior, at the annual convention of the American Psychological Association August, 1985. Its preparation was supported in part by a grant from the Office of Special Education and Rehabilitation Services.

2. To guide them toward selecting self management targets, and designing, implementing and evaluating change programs, students in the course in applied behavior analysis at the University of Massachusetts use Applying Behavior Analysis: A program for developing professional competence (Sulzer-Azaroff & Reese, 1982).

3. This author offers a fully programmed two semester course, including texts, PSI materials, lectures, discussions, workshops, and field activities, plus pre-set standards of student performance.